TAGGING STUDIES OF RED SNAPPER (*LUTJANUS CAMPECHANUS*) AND VERMILION SNAPPER (*RHOMBOPLITES AURORUBENS*) OFF THE SOUTH TEXAS COAST[1]

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ABSTRACT

Two hundred ninety-nine red snapper (*Lutjanus campechanus*) and 793 vermilion snapper (*Rhomboplites aurorubens*) were tagged at six locations off the south Texas coast from May 1977 to January 1978. Fifty-six (5%) of the tags were returned (17 red and 39 vermilion snappers). The red snapper were free between 59 and 253 days, and the vermilion snapper were free between 30 and 847 days. Only three tag returns showed snapper movement, which was to adjacent banks or structures.

INTRODUCTION

The objective of this study was to determine the extent of the movements of red snapper (*Lutjanus campechanus*) and vermilion snapper (*Rhomboplites aurorubens*) off south Texas by tagging.

Snappers in the southeast United States are important to commercial and recreational fishermen. Recreational fishermen landed an estimated 17.3 million pounds (7,862.4 metric tons) of red snapper in 1970, and commercial fishermen landed 6.4 million pounds (2,903 metric tons) in 1977 (U.S. Dept. Commerce 1978).

The red snapper fishery off Texas developed in the 1880s, and by the turn of the century, the ports of Freeport and Brownsville were being supplied by small vessels with snapper that were caught on grounds already abandoned by large vessels (Camber 1955). The principal fishing grounds were off Galveston, but the banks off south Texas were also frequented.

Despite studies of the history of the Gulf snapper fishery (Jarvis 1935, Camber 1955, Carpenter 1965) and of the biology of the red snapper in Texas waters (Moseley 1966, Bradley and Bryan 1974), nothing is known about the movements of red or vermilion snapper off Texas.

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METHODS

Tagging took place at the following areas: Citgo Rig A-76, Baker Bank, Aransas Bank, Hospital Bank, Southern Bank and Dream Bank (Fig. 1). Longitude and latitude, depth, and number of tagged fish released for these areas are listed in Table 1. Fishes were tagged: in the spring (May 26–June 3, 1977) at Aransas, Hospital and Southern Banks; in the summer (July 24–28) at Citgo Rig A-76 and Baker Bank; in the fall (October 21–25) at Dream Bank; and in the winter (January 24–28) at Southern Bank.

Fish for tagging were caught on hook and line. Three fishing rods, each with 12-volt electric reels, were used at each tagging location. The terminal tackle consisted of five circle hooks on a 130-lb test monafilament leader and 1–2 lb (454–908 g) lead sinker. Frozen squid and fresh fish were used as bait.

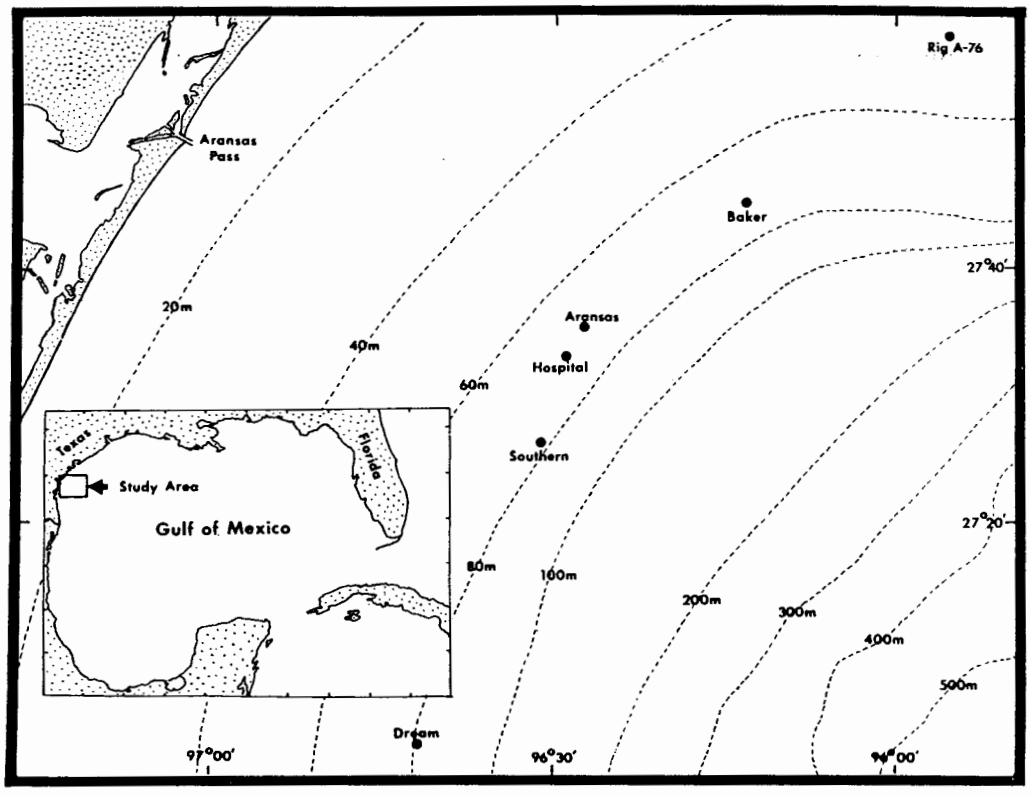

FIG. 1. Locations where snappers were tagged.

TABLE 1

Snapper tagging locations.

Name	Latitude x Longitude	Fishing Depths in Meters	No. tags released RS	VS
Citgo Rig A-76	27°58'N x 96°07'W	50	33	35
Baker Bank	27°45'N x 96°14'W	57	57	179
Aransas Bank	27°36'N x 96°27'W	60	148	314
Hospital Bank	27°33'N x 96°29'W	60	6	91
Southern Bank	27°26'N x 96°32'W	60	3	137
Dream Bank	27°02'N x 96°43'W	68	52	37

Most red snapper captured had expanded gases trapped in the body cavities. To allow fish to return to depths, we released the gases by puncturing the abdomens with a hypodermic needle.

All fishes to be tagged were measured to the nearest millimeter of fork length. They were tagged with a Floy gun tag at the base of the dorsal fin, and released at the surface. Tags were red, 3 inches (23.1 cm) long and had a legend: "Reward, NMFS, P.O. Box 1208, Port Aransas, TX." A tag number followed the legend.

Rewards between $5 and $25 were offered. Two preselected tag numbers out of each 100 were worth $25, five others were worth $10, and all others (93 out of 100) each were worth $5. Posters advertising the tagging study were placed at various locations around Port Aransas.

RESULTS AND DISCUSSION

Two hundred ninety-nine red and 793 vermilion snappers were tagged. Length-frequency distributions are shown in Figures 2 and 3. Size modes were 250–275 mm FL for red snapper and 225–250 mm FL for vermilion snapper.

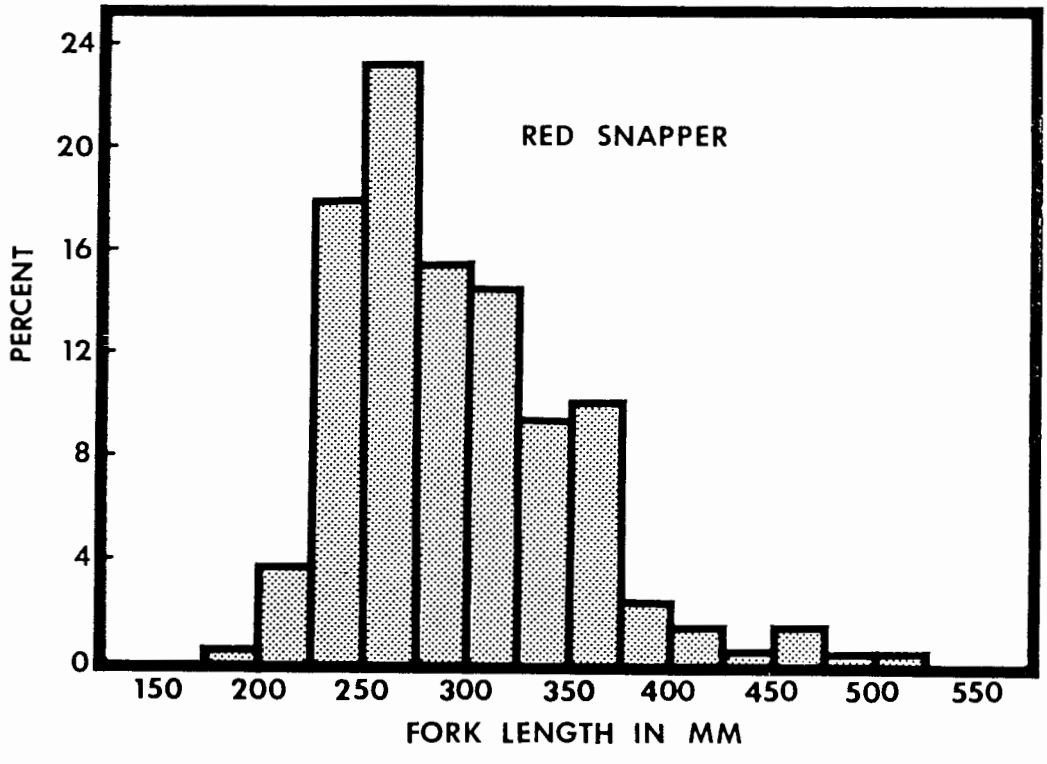

FIG. 2. Length-frequency distribution of 299 tagged red snapper.

Return Rates

The return rate for red snapper was 5.6% (17 tags) and for vermilion snapper was 4.9% (39 tags). Table 2 shows that other researchers had higher red snapper return rates (12.5–33.0%) but lower vermilion snapper return rates (0–4.1%). Generally, sizes of snappers tagged by the other researchers were similar to the sizes we tagged. Differences between return rates among these investigators may be attributable to differences in fishing pressure. Red snapper were heavily fished

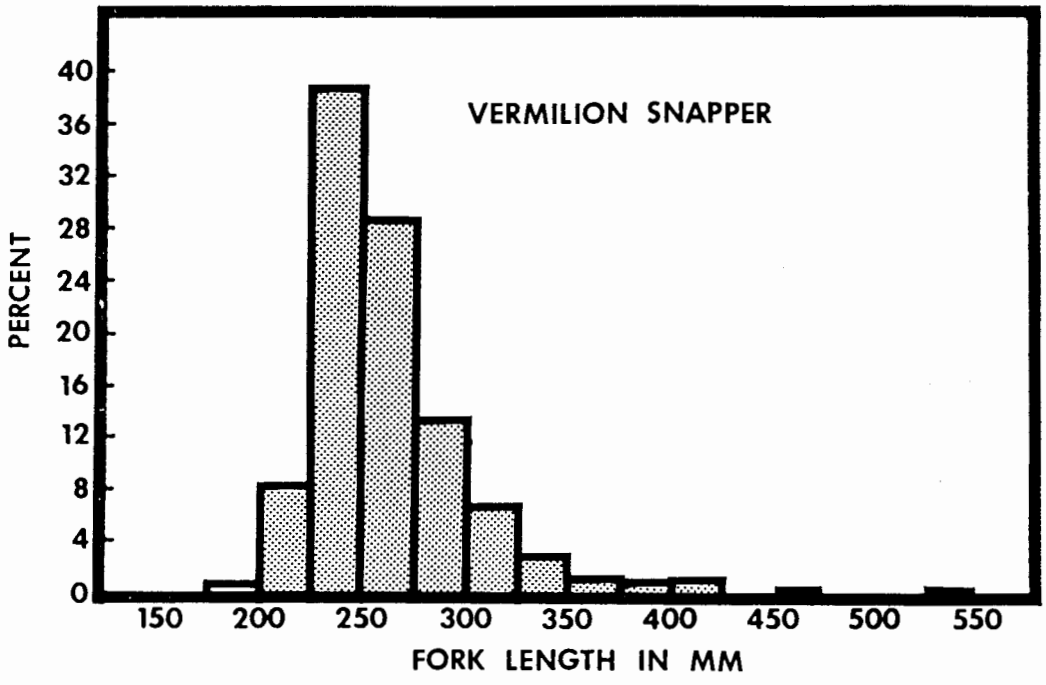

FIG. 3. Length-frequency distribution of 793 tagged vermilion snapper.

TABLE 2

Summary of other snapper tagging studies.

Author(s)	No. Tagged	No. Returned	Return Rate
	Red Snapper		
Topp, 1963	379	65	17.2%
Beaumariage, 1964	336	111	33.0%
Beaumariage and Wittich, 1966	345	97	28.1%
Moe, 1966	24	3	12.5%
Beaumariage, 1969	312	82	26.3%
Beaumariage, 1969 (includes all above authors except Moe)	1,372	384	28.0%
	Vermilion Snapper		
Topp, 1963	117	0	0.0%
Beaumariage, 1964	218	9	4.1%
Beaumariage and Wittich, 1966	57	0	0.0%
Moe, 1966	13	0	0.0%
Beaumariage, 1969	4	0	0.0%
Grimes, 1976	455	2	0.4%

in Florida, where most of the other tagging occurred, but vermilion snapper were usually considered a nuisance (Moe 1963). In the Carolinas (Grimes 1976) and in Texas, both species are valued. In fact, the vermilion is the most frequently angled snapper in the Carolinas (Grimes *et al.* 1977).

Movement

There was very little movement by either species (Table 3). No movement was indicated by returns of any of the 48 tags at large less than 160 days. Of the eight at large longer, three showed movement to an adjacent bank or oil rig. Of these

TABLE 3

Data on snapper tag returns (V = vermilion snapper; R = red snapper).

Tag No.	Sp.	Tag Date	Return Date	Days Out	Tagging Location	Return Location	Km. Trav.	FL at Tagging (mm)	FL at Return (mm)	Length Change
15058	V	5-31-77	6-30-77	30	Southern	Same	0	255	255	0
15107	V	5-31-77	7-7-77	37	Southern	Same	0	230	240	+10
15215	V	6-2-77	7-9-77	37	Hospital	Same	0	290	290	0
10357	V	5-29-77	7-26-77	58	Aransas	Same	0	235	235	0
10964	V	5-28-77	7-26-77	59	Aransas	Same	0	290	290	0
10395	V	5-28-77	7-26-77	59	Aransas	Same	0	242	230	-12
10974	V	5-28-77	7-26-77	59	Aransas	Same	0	220	230	+10
15087	V	5-31-77	8-6-77	67	Southern	Same	0	250	250	0
10970	V	5-28-77	8-9-77	73	Aransas	Same	0	230	-	-
10151	V	5-30-77	8-23-77	85	Aransas	Same	0	240	240	0
10170	V	5-30-77	8-23-77	85	Aransas	Same	0	250	260	+10
10182	V	5-30-77	8-23-77	85	Aransas	Same	0	240	230	-10
09402	V	5-29-77	8-23-77	86	Aransas	Same	0	230	225	-5
10352	V	5-28-77	8-23-77	87	Aransas	Same	0	225	265	+40
10427	V	5-28-77	8-23-77	87	Aransas	Same	0	265	255	-10
10433	V	5-28-77	8-23-77	87	Aransas	Same	0	235	220	-15
10494	V	5-28-77	8-23-77	87	Aransas	Same	0	250	240	-10
10499	V	5-28-77	8-23-77	87	Aransas	Same	0	227	225	-2
09547	V	5-27-77	8-23-77	88	Aransas	Same	0	230	220	-10
09557	V	5-27-77	8-23-77	88	Aransas	Same	0	240	225	-15
10110	V	5-30-77	8-25-77	87	Aransas	Same	0	250	245	-5
10140	V	5-30-77	8-25-77	87	Aransas	Same	0	225	230	+5
09689	R	5-29-77	8-25-77	88	Aransas	Same	0	295	310	+15
10410	V	5-28-77	8-25-77	89	Aransas	Same	0	235	240	+5
10447	V	5-28-77	8-25-77	89	Aransas	Same	0	235	230	-5
10492	V	5-28-77	8-25-77	89	Aransas	Same	0	240	235	-5
09384	R	5-27-77	8-25-77	90	Aransas	Same	0	360	335	-25
09408	V	5-27-77	8-25-77	90	Aransas	Same	0	230	225	-5
09546	R	5-27-77	8-25-77	90	Aransas	Same	0	280	304	+24
09693	R	5-29-77	9-11-77	105	Aransas	Same	0	255	270	+15
09704	V	5-29-77	9-11-77	105	Aransas	Same	0	255	255	0
10448	R	5-28-77	9-11-77	106	Aransas	Same	0	240	245	+5
10114	V	5-30-77	9-15-77	108	Aransas	Same	0	255	250	-5
10094	V	5-30-77	9-15-77	108	Aransas	Same	0	245	241	-4
10375	V	5-29-77	9-15-77	109	Aransas	Same	0	235	265	+30
10381	V	5-29-77	9-15-77	109	Aransas	Same	0	265	251	-14
10487	R	5-28-77	9-15-77	110	Aransas	Same	0	255	260	+5
09393	R	5-27-77	9-15-77	111	Aransas	Same	0	230	267	+37
10979	V	5-28-77	9-20-77	115	Aransas	Same	0	260	257	-3
15283	R	7-24-77	9-21-77	59	Baker	Same	0	470	-	-
15298	R	7-24-77	9-21-77	59	Baker	Same	0	350	-	-
15308	R	7-24-77	9-25-77	63	Baker	Same	0	295	295	0
10134	V	5-30-77	10-4-77	127	Aransas	Same	0	225	225	0
10485	R	5-28-77	10-4-77	129	Aransas	Same	0	250	260	+10
09690	R	5-29-77	10-8-77	132	Aransas	Same	0	230	240	+10
10980	R	5-28-77	10-8-77	133	Aransas	Same	0	240	255	+15
09541	V	5-27-77	10-8-77	134	Aransas	Same	0	250	250	0
10141	V	5-30-77	10-25-77	151	Aransas	Same	0	265	250	-15
10367	V	5-29-77	11-15-77	170	Aransas	Hosp./South.	10-20	235	235	0
10442	V	5-28-77	11-15-77	171	Aransas	Hosp./South.	10-20	245	240	-5
09366	V	5-27-77	11-15-77	172	Aransas	Same	0	248	235	-13
09697	R	5-29-77	12-31-77	215	Aransas	Same	0	225	244	+19
15524	R	7-26-77	1-4-78	162	A-76	A-100	5	280	-	-
09558	R	5-27-77	1-7-78	224	Aransas	Same	0	240	264	+24
10989	R	5-27-77	2-4-78	253	Aransas	Same	0	250	230	-20
15554	V	7-26-77	11-20-79	847	A-76	Same	0	210	480	+270

three, two were vermilion snapper which, in 170 days moved from Aransas Bank to either Hospital (10 km) or Southern Bank (20 km)—the fisherman was unsure of the capture location. The third return was of a red snapper tagged at Citgo Rig A-76 and recaught at another rig about 5 km away after 162 days.

In summarizing the red snapper tagging in Florida, Beaumariage (1969) found that fish tagged in less than 27.4 m of water moved little, but ten returns suggested that fish released in deeper water moved more. These returns were from fish of a similar size to those we tagged. Seven of these ten returns showed easterly movement off northwest Florida. Eight of the ten were free for over 240 days. Only two of our 56 recaptured fish were at large this long.

Grimes *et al.* (1977) stated that vermilion snapper are apparently nonmigratory. Neither the two returns reported by him in 1976 nor the nine returns reported by Beaumariage (1964) showed any movement. Of the 39 returns from this study, only two showed even slight movements.

Length Change

There is a great variation in the change in length of returned snappers (Table 3) and many fish became shorter. Topp (1963) suggested that shrinkage caused by drying and freezing recaptured fish, and the adverse effects of tags on the activities of fishes preclude basing conclusions about growth on recaptured fish.

Predation

Predation of newly tagged fishes was observed in two instances. Once greater amberjack (*Seriola dumerili*), and once great barracuda (*Sphyraena barracuda*) were the predators. The amount of predation below the surface was unknown, but may have been considerable. Topp (1963) discussed this problem and concluded that it will always be a concern in deep-water tagging. Predation might have been minimized by using a cage in which snappers could have been lowered to the bottom and then released.

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